14. The apparatus of claim **1**, wherein the apparatus is a diode.

15. The apparatus of claim **1**, wherein the apparatus forms part of a photodetector or a rectenna.

16. A method comprising:

forming an apparatus from a first layer of electrically conductive material, a second layer of electrically conductive material and a layer of electrically insulating material to provide an apparatus comprising the first and second layers of electrically conductive material separated by the layer of electrically insulating material, wherein one or both layers of electrically conductive material comprise graphene, and wherein the apparatus is configured such that electrons are able to tunnel from the first layer of electrically conductive material through the layer of electrically insulating material to the second layer of electrically conductive material.

17. The method of claim **16**, wherein formation of the apparatus comprises:

depositing the first layer of electrically conductive material on top of a supporting substrate;

depositing the layer of electrically insulating material on top of the first layer of electrically conductive material; and

depositing the second layer of electrically conductive material on top of the layer of electrically insulating material.

18. The method of claim **16**, wherein formation of the apparatus comprises:

depositing the first layer of electrically conductive material on top of a first supporting substrate;

depositing the layer of electrically insulating material on top of the first layer of electrically conductive material;

depositing the second layer of electrically conductive material on top of a second supporting substrate;

placing the first supporting substrate on top of the second supporting substrate such that the first layer of electrically conductive material is separated from the second layer of electrically conductive material by the layer of electrically insulating material; and

removing the first supporting substrate.

19. The method of claim **16**, wherein formation of the apparatus comprises:

depositing the first layer of electrically conductive material on top of a first supporting substrate;

depositing the layer of electrically insulating material on top of the first layer of electrically conductive material;

depositing the second layer of electrically conductive material on top of a second supporting substrate;

placing the second supporting substrate on top of the first supporting substrate such that the first layer of electrically conductive material is separated from the second layer of electrically conductive material by the layer of electrically insulating material; and

removing the second supporting substrate.

20. A method comprising:

controlling a flow of electrical current to be in a first direction in an apparatus,

the apparatus comprising first and second layers of electrically conductive material separated by a layer of electrically insulating material, wherein one or both layers of electrically conductive material comprise graphene, and wherein the apparatus is configured such that electrons are able to tunnel from the first layer of electrically conductive material through the layer of electrically insulating material to the second layer of electrically conductive material,

the flow of electrical current controlled by providing a difference in voltage to the first and second layers of electrically conductive material, and/or providing a difference in work function between the first and second layers of electrically conductive material.

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